



BILLING CODE: 3710-08

DEPARTMENT OF DEFENSE

Department of Army

Notice of Intent to seek Partners for a Cooperative Research and Development Agreement and Licensing Opportunity for Smoothed Symbol Transition Modulation invented by U.S. Army Aviation and Missile Command

AGENCY: Department of Army, DoD.

ACTION: Notice of Intent Seeking Partners.

SUMMARY: The U.S. Army Aviation and Missile Command (AMRDEC) is seeking Cooperative Research and Development Agreement (CRADA) partners to collaborate in transitioning smoothed symbol transition modulation (SSTM) into commercial and/or government application(s). SSTM references approved for public release are provided [2-4]. Interested potential CRADA collaborators will receive detailed information on the current status of the project after signing a confidentiality disclosure agreement (CDA) with AMRDEC. Guidelines for the preparation of a full CRADA proposal will be communicated shortly thereafter to all respondents with whom initial confidential discussions will have established sufficient mutual interest. CRADA applications submitted after the due date may be considered if a suitable CRADA collaborator has not been identified by AMRDEC among the initial pool of respondents. Licensing of background

technology related to this CRADA opportunity is also available to potential collaborators.

DATES: Interested candidate partners must submit a statement of interest and capability to the AMRDEC point of contact before March 8, 2015 for consideration.

ADDRESSES: Comments and questions may be submitted to: Department of Army, US Army Research, Development and Engineering Command, Aviation and Missile Research, Development, and Engineering Center, ATTN: RDMR-CST, Office of Research and Technology Applications (Ms. Wallace), 5400 Fowler Road, Redstone Arsenal, AL 35898.

FOR FURTHER INFORMATION CONTACT: Questions about the proposed action can be directed to Ms. Cindy Wallace (256) 313-0895, Office of Research and Technology Applications, email: cindy.s.wallace.civ@mail.mil.

SUPPLEMENTARY INFORMATION:

1. Project Description. AMRDEC seeks to ensure that technologies developed by AMRDEC are expeditiously commercialized and brought to practical use. The purpose of a CRADA is to find partner(s) to facilitate the development and commercialization of a technology that is in an early phase of development. Respondents interested in submitting a CRADA proposal should be aware that it may be necessary for them to secure a patent license to the above-mentioned patent pending technology in order to be able to commercialize products arising from a CRADA. CRADA partners are afforded

an option to negotiate an exclusive license from the AMRDEC for inventions arising from the performance of the CRADA research plan.

2. Technology Overview. Conventional modulation techniques have step changes between symbols. The step changes embed rectangular windowing functions, with poor power spectral density function characteristics, into the modulated waveform [1], [2], [3].

Smoothed symbol transition modulation (SSTM) [1], [2], [3], [4] waveform consists of half cycle raised cosine waveforms and zero slope line segments waveforms concatenated together to create a smooth waveform. All SSTM symbol transitions occur at zero slope points. The SSTM waveform requires less bandwidth and has a much faster power spectral density convergence than conventional modulation.

Binary SSTM and 16 quadrature amplitude modulation SSTM (QAM-SSTM) simulations demonstrate the utility of the modulation technique [1], [2], [3], [4]. Smoothed symbol transition modulation simply adds one more block before the output (final) modulation stage [1], [2], [3], [4]. SSTM offers opportunities for improved performance under intersymbol interference, multipath signal conditions, dispersive channel conditions and timing jitter conditions. In terms of digital signal processing, SSTM is low cost, and offers significant performance improvements over conventional rectangular windowing function limited modulators.

Under the CRADA, further research and development will be conducted on current and new algorithm(s) and further development in characterization is

also needed. Based on the results of these experiments and other data, the program will then develop a target product profile. The developed algorithm(s) might be further improved to address specific aspects of this target product profile and, if necessary, to optimize its computation requirements and performance. The CRADA scope will also include studies beyond candidate selection including all aspects of algorithm studies, developments, simulations, optimization, and performance testing leading to a successful smoothed symbol transition modulation application.

Collaborators should have experience in the development of digital signal processing algorithms, digital modulation, software defined radios, communications systems, and technology transition. The target end products include government and commercial communications systems, wireless applications (radio, television, WiFi, telecom, cell phones, data, satellite communications, et al.), radar, internet applications (cable modems), medical imaging, and other unique applications identified by the CRADA partner.

The full CRADA proposal should include a capability statement with a detailed description of collaborators' expertise in the following and related technology areas: (1) conventional digital modulation, digital signal processing, software defined radios, communications systems, testing and evaluation of communications systems, etc.; (2) communications theory, information theory, and bit error rate; (3) expertise in windowing functions; (4) collaborators' expertise in successful technology transition; and (5) collaborator's ability to provide adequate funding to support some project studies is strongly

encouraged. A preference will be given to collaborators who shall manufacture smoothed symbol transition modulation systems in the United States.

Collaborators are encouraged to properly label any proprietary material in their CRADA proposal as PROPRIETARY. Do not use the phrase “company confidential.”

3. Publications.

a. P. Jungwirth: "Smoothed Symbol Transition Modulation," US Patent Application 14/181221, February 14, 2014. Not yet published.

b. P. Jungwirth: "Smoothed Symbol Transition Modulation," AlaSim International Conference & Exposition," Huntsville, Alabama, pp. TBD, May 2014.

<http://www.almsc.org/alasim-international.shtml>

c. P. Jungwirth: "Smoothed Symbol Transition Modulation DSP Algorithm," TAPR Conference, Austin, TX, pp. 32 – 51, September 2014.

<https://www.tapr.org/pdf/DCC2014-SmoothedSymbolTransitionModulation-Patrick-Jungwirth.pdf>

d. P. Jungwirth: "Smoothed Symbol Transition Modulation 16 QAM, Submitted to The Forum for Communications Experimenters, December 2014.

(email Ms. Wallace at cindy.s.wallace.civ@mail.mil to request a copy of this paper)

Brenda S. Bowen,
Army Federal Register Liaison Officer.

